

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of)

Rural Health Care Support Mechanism)

WC Docket No. 02-60

**COMMENTS OF INTERNET2 REGARDING NATIONAL
LAMBDA RAIL, INC.'S PETITION FOR
RECONSIDERATION OR CLARIFICATION**

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^{1/} Order, *Rural Health Care Support Mechanism*, WC Docket No. 02-60, FCC 06-144 ¶ 2 (rel. Sept. 29, 2006) (hereinafter “*Order*”).

INTRODUCTION AND SUMMARY

The Commission's September 29, 2006 *Order* making rural health care funds available for the deployment of state and regional broadband networks dedicated to health care, and for connecting these networks to Internet2's national, high-speed, institutional-access-only backbone, was a laudable step forward in promoting the well-being of all Americans, and of rural residents in particular. The "ubiquitous nationwide broadband network dedicated to health care" envisioned by the *Order* will improve the availability and quality of health care services, especially in underserved areas of the country, by giving patients and doctors greater access to telemedicine applications, diagnostic resources, and medical expertise currently available only at large health care institutions. The program will also lay the foundation for a nationwide disaster preparedness and response system, as well as promote the President's Health Information Technology Plan, including its goal of implementing a national database of electronic medical records. Finally, the pilot program is an important step toward fulfilling the Commission's statutory mandate "to enhance . . . access to advanced telecommunications and information services for *all* . . . health care providers," particularly those in rural areas.^{2/}

But while the Commission's *Order* is a significant step forward, it is only a first step. The Commission prudently recognized that before committing to permanently expanding the rural health care universal service program, it needed a more complete and practical understanding of how best to promote the deployment of these local networks and integrate them into a ubiquitous national network.^{3/} It therefore adopted a two-year trial to fund a limited

^{2/} 47 U.S.C. § 254(h)(2)(A) (emphasis added).

^{3/} *Order* ¶ 9.

number of projects, after which the Commission will issue a report of its findings. The report will inform the establishment of a broader program, which would presumably be open to more entities.^{4/}

A pilot program, by its nature, is limited in scope and duration. The Commission's goal during the next two years should be to fund those projects that demonstrate the feasibility of the Commission's ultimate end: a "ubiquitous nationwide broadband network dedicated to health care" — one that "increas[es] broadband connectivity *among healthcare providers* at the *national*, state and local levels," and that would be capable of supporting a coordinated response to a national crisis, as well as a national medical records system.^{5/} Testing the feasibility of integrating state and regional health care networks into a national system is a key element of the pilot program. It is therefore essential that the various state and regional networks funded by the program be able to interconnect and communicate with one another.

However, the advanced private and institutional backbone networks to which the state or regional networks would connect — including Internet2's and NLR's — do not themselves interconnect with each other. If the Commission truly wants to test the interoperability of the local health care networks and the feasibility of integrating them into a ubiquitous national whole, then all of the participating local networks should connect to the same national backbone. Regardless of whether it makes sense for a *permanent* program to include funding for connections to multiple backbones, the pilot program should focus on one backbone so that it will yield the practical information the Commission needs to fashion a successful permanent program.

^{4/} *Id.* ¶¶ 13, 16, 9.

^{5/} *Id.* ¶¶ 2, 4 (emphases added).

The Commission was therefore correct to fund connections to only one national backbone, and it was correct to choose Internet2's backbone for that role. Only Internet2's network has a nationwide footprint and currently provides connections in all fifty states, Puerto Rico, and the District of Columbia. By contrast, it is Internet2's understanding that there are numerous states in which NLR currently does not provide connectivity, including Connecticut, Delaware, Kansas, Kentucky, Maine, Massachusetts, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, North Dakota, Rhode Island, South Carolina, South Dakota, and Vermont. In addition, every institution that connects to NLR — including those listed in Attachment B of NLR's Petition — connects or could easily be connected to Internet2's backbone. The reverse is not true.

Internet2 has other qualifications that further support the Commission's selection. The depth of Internet2's experience in health care, with active partnerships with medical institutions and medical information management associations, is unmatched. Its member institutions and working groups already use the Internet2 backbone to support innovative telehealth and telemedicine programs, including telepathology, radiological information management, and long-distance continuing medical education. They are also working to find solutions for health care network interoperability, electronic medical records management and security, and patient and provider authentication. Moreover, Internet2's backbone has an unparalleled record of reliability. And Internet2's network is the ideal test bed for the Commission's pilot program, given its transparency and the access that researchers already have to its network performance metrics.

Internet2 therefore respectfully opposes NLR's petition. Internet2 takes no position at this time on whether the Commission's permanent program should include additional, non-

interconnected backbones. But doing so now would spread the limited project funding now available more thinly among multiple backbones and undermine the robustness of the Commission's pilot program. It would also hamper the program's ability to test the interoperability of the participating state and regional networks and the potential for integrating them into a national network.

ARGUMENT

I. THE COMMISSION HAS DISCRETION TO STRUCTURE THIS TIME-LIMITED PILOT PROGRAM IN THE MANNER THAT PROVIDES THE BEST TEST OF ITS POLICY OBJECTIVES.

The Commission has adopted only a *pilot* program, not its last word on rural health care funding. The point of the program is to yield “a more complete and practical understanding” of how the Commission “can more effectively use available funding to bring the benefits of broadband connectivity to health care providers and patients in those areas of the country most in need.”^{6/} It will last for only two years, at which point, the Commission “will issue a report detailing the results of the program,”^{7/} which will be incorporated into the record of “a future rulemaking proceeding that will explore permanent rules to enhance access to advanced services for public and non-profit health care providers.”^{8/}

The *Order* lays out clear goals for the pilot program. One of those is testing the feasibility of integrating these new state and regional health care networks into a single, nationwide, interoperable whole — in the Commission's words, “a ubiquitous nationwide

^{6/} *Order* ¶ 9.

^{7/} *Id.*

^{8/} *Id.* ¶ 4.

broadband network.”^{9/} The pilot is intended to “increase broadband connectivity among health care providers *at the national, state and local levels*.”^{10/} This focus on ubiquity also appears in the Commission’s congressional mandate “to enhance . . . access to advanced telecommunications and information services for *all* . . . health care providers.”^{11/} Ubiquitous interconnectedness and interoperability are key to achieving the Commission’s hoped-for national security and public health benefits. As the *Order* recognizes, “a ubiquitous nationwide broadband network dedicated to health care will enhance the health care community’s ability to provide a rapid and coordinated response in the event of a national crisis.”^{12/} Ubiquitous interconnectivity and interoperability are also key to “facilitat[ing] the President’s goal of implementing electronic medical records nationwide,”^{13/} since the value of a national electronic medical records database derives from the ability of health care providers to access patients’ records no matter where the provider is located.

Because this is an interim program designed to test certain concepts and initiatives on a smaller scale before committing to them in a more permanent (and expensive) program, the Commission has the discretion to structure the pilot in a way that best tests its objectives and

^{9/} *Id.* ¶ 2.

^{10/} *Id.* ¶ 4 (emphasis added).

^{11/} 47 U.S.C. § 254(h)(2)(A) (emphasis added).

^{12/} *Order* at ¶ 2. *See also id.* ¶ 4 (explaining how “increasing broadband connectivity among health care providers at the national, state, and local levels would . . . provide vital links for disaster preparedness and emergency response”).

^{13/} *Id.* ¶ 4.

yields the most useful data for designing a permanent program.^{14/} If the Commission wants to test the feasibility of integrating state and regional health care networks into a national interoperable whole, the program should fund only those connections that enable all participating health care providers to communicate with one another.

As they stand now, however, the broadband networks that are potential candidates for inclusion in the pilot program — including Internet2's and NLR's — do not interconnect with one another. Thus, a rural health care provider connected only to NLR could not communicate with a major research facility connected only to Internet2. The Commission therefore made the reasonable choice to fund connections to only a single advanced backbone network (at least for the two-year duration of the pilot program) so that the participating local networks can in fact communicate with one another. Supporting interoperability and interconnectedness will not only give participating providers access to the widest possible range of medical resources, but also will provide a robust test of the potential for developing a nationwide interoperable network capable of supporting a coordinated response to a national emergency as well as a national electronic health care records program.

NLR's Petition asks the Commission to alter its carefully crafted pilot program from one that funds connections to a single nationwide backbone to one that funds them to multiple,

^{14/} Under section 4(i) of the Act, “[t]he Commission may perform any and all acts, make such rules and regulations, and issue such orders, not inconsistent with this chapter, as may be necessary in the execution of its functions.” 47 U.S.C. 154(i). Additionally, the pilot program is transitory in nature, and agencies utilizing such interim measures are accorded substantial deference. *Cf. Competitive Telecomm. Ass’n v. FCC*, 117 F.3d 1068, 1073-74 (8th Cir. 1997) (“substantial deference by courts is accorded to an agency when the issue concerns interim relief”) (quoting *MCI Telecomms. Corp. v. FCC*, 750 F.2d 135, 140 (D.C. Cir. 1984); *Cf. CTIA v. FCC*, 87 F.3d 522, 531 (D.C. Cir. 1996) (“The proper judicial response to an interim rule is . . . to review it with the understanding that the agency may reasonably limit its commitment of resources to refining a rule with a short life expectancy.”)).

unconnected backbones. Doing so would alter the pilot program in a manner that would thwart its central purpose. Granting the Petition would transform the proposed health care network from a unified, nationwide network — in which all participants are connected not only to each other, but also to other important health resources, such as the National Institutes of Health and the National Library of Medicine — into a series of balkanized regional networks across which participating health care providers could not connect with each other or access other important health resources. These unconnected health care networks would also be incapable of achieving the Commission’s national security aims or the President’s goal of developing a nationwide database of electronic medical records. Furthermore, granting NLR’s Petition would increase the complexity of administering the pilot program by requiring the Commission to monitor and test performance across multiple unconnected networks.

In short, the Commission’s determination to use a single backbone for its pilot program was correct, necessary, and well within its discretion. There is no reason for the Commission to alter or delay its program at this time, particularly when the proposed alteration threatens to decrease the program’s value as a test and delay bringing the important benefits of telemedicine to rural areas. Again, the *Order* establishes only a time-limited test, not the Commission’s final word on permanent funding for rural health care networks. NLR is free to seek inclusion in whatever final mechanisms the Commission ultimately adopts, and Internet2 takes no position at this time on whether that permanent program should fund connections to multiple backbones.

II. THE COMMISSION CORRECTLY CHOSE INTERNET2 AS THE ONLY BACKBONE FOR ITS PILOT PROGRAM.

As explained in its *Order*, the Commission chose to fund connections to Internet2 because it operates a “dedicated national backbone” that would give “healthcare providers at the state and local levels . . . the opportunity to benefit from advanced applications in continuing

education and research.”^{15/} The Commission specifically cited Internet2’s links to a wide range of “government research institutions, as well as academic, public, and private health care institutions that are repositories of medical expertise and information.”^{16/} Even NLR does not dispute the appropriateness of using Internet2’s network as a backbone for the pilot program; on the contrary, its Petition tries to argue that NLR is sufficiently like Internet2 that it deserves inclusion as well.^{17/}

Yet Internet2 *is* unique, and the Commission’s selection of Internet2’s network as the exclusive backbone for the pilot program was both correct and well within the Commission’s discretion. Only Internet2 has a ubiquitous nationwide network that already provides connections in all fifty states, Puerto Rico, and the District of Columbia. It is Internet2’s understanding that NLR, on the other hand, currently does not provide connectivity in at least sixteen states. Only Internet2 has extensive experience in health care, actively partnering with research institutions and professional organizations like the Health Information and Management Systems Society (“HIMSS”) that are implementing the groundbreaking telehealth and telemedicine applications that the Commission seeks to promote. Only Internet2 has a long institutional history and a demonstrated record of network reliability and financial stability. Finally, only Internet2 has shown that it is capable of integrating local and regional networks into a nationwide whole, as its experience interconnecting multiple elementary and secondary education networks in its K20 initiative demonstrates.

^{15/} *Order* ¶ 2.

^{16/} *Id.*

^{17/} *See* Petition ¶¶ 11-13.

A. Only Internet2 Can Support the Commission's Vision of a "Ubiquitous Nationwide Broadband Network Dedicated to Healthcare."

Internet2's network is the right backbone to provide the "connectivity among health care providers at the national, state and local levels"^{18/} and the "ubiquitous nationwide broadband network dedicated to health care"^{19/} that the pilot program is meant to promote. Only Internet2's far-reaching backbone currently provides connectivity in all fifty states, the District of Columbia, and Puerto Rico. By contrast, it is Internet2's understanding that NLR presently does not provide connections to its network in many states, including Connecticut, Delaware, Kansas, Kentucky, Maine, Massachusetts, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, North Dakota, Rhode Island, South Carolina, South Dakota, and Vermont.

While NLR's Petition implies that there are health care institutions that would be unable to participate in the pilot program if connections to NLR are not funded,^{20/} that is simply not the case. Internet2's network is connected to *every one* of the regional optical networks, or "RONs," that NLR is. And every institution that connects to NLR — including the ones listed in Attachment B of NLR's Petition — connects to or could easily connect to Internet2's backbone. By contrast, many health care and educational institutions currently connected to Internet2 are not connected to NLR. Accordingly, adding NLR to the pilot program risks balkanizing it: a local health care network that connects only to NLR's backbone would be unable to access important resources connected only to Internet2.

^{18/} Petition ¶ 4.

^{19/} *Id.* ¶ 2.

^{20/} Petition ¶ 15.

Moreover, Internet2 can add new connections to its network quickly, easily, and inexpensively as a result of the rich connection point options provided by its infrastructure's extensive backhaul capabilities.^{21/} This capability is especially important to connect health care providers located the rural areas that would most benefit from telemedicine applications. In addition, Internet2's agreement with Level 3 Communications, Inc. ("Level 3") will enable it to offer services across the entire Level 3 network, even beyond Internet2's current far-reaching backbone. In short, Internet2's network has the ability to bring "advanced telecommunications and information services [to] *all . . . health care providers,*" as Congress intended.^{22/}

B. Internet2 Has Uniquely Deep Experience in Health Care and Health Information Management Systems.

1. Telemedicine and Medical Education.

Internet2 was organized to facilitate the development of networking applications, including telemedicine applications that allow doctors and specialists to remotely monitor patients, collaborate on treatments in real time with specialists around the globe, and search large information resources and databases. Internet2 has been engaged in telemedicine-related work in collaboration with its health care institution members for years. In 2000, Internet2 established a health sciences advisory group comprised of faculty, researchers, clinicians, and industry experts in health care and life sciences to provide leadership to the Internet2 Health Sciences Initiative, engage medical industry participation, and advise on the initiative's strategic direction. Today, Internet2's health sciences work groups and committees facilitate the collaborative work of more

^{21/} Internet2 will continue to be able to add new network connections quickly, easily, and inexpensively after deployment of its new network, discussed *infra* at pages 18-19, because of the new network's high density of potential interconnection locations that result in sophisticated add/drop provisioning capability.

^{22/} 47 U.S.C. § 254(h)(2)(A).

than 120 connected healthcare organizations and medical schools to develop and deploy advanced Internet technologies in support of work in the health sciences.^{23/}

Internet2 health science applications are already enabling breakthroughs in medical education, research, and clinical practice. Doctors are gaining access to specialists for remote consultations, students are learning anatomy with the support of new tools and technologies, and smart databases are assisting with diagnosis and knowledge sharing among researchers. For example:

- Pathologists at the three hospitals that comprise the University of Pennsylvania Health System have been using Internet2's advanced network to support a Digital Video Transport System ("DVTS") for transmitting high-quality video telepathology and telemicroscopy images. DVTS uses 30 Mbps uncompressed video to provide high-quality images with low latency. DVTS can also be used in multicast mode to allow three or more sites to participate in a single conference. This inexpensive method of transmitting high-quality streaming video and audio enables doctors to perform consultations at remote hospitals where there is no pathologist on site, to offer second-opinion consultations, and to support long-distance education. Pathologists at the University of Pennsylvania Health System already use DVTS and Internet2's advanced network to perform real-time clinical case consultations.^{24/}
- Researchers at the University of Medicine & Dentistry of New Jersey, Rutgers University, and the University of Pennsylvania have developed content-based image retrieval tools for diagnostic pathology. The NIH-funded PathMiner system is a web-based set of tools for interactive telemedicine, intelligent archiving, and automated decision support in pathology. Using Internet2's advanced network, PathMiner enables individuals to submit query images from local or remote computers — or robotic or virtual microscopes — to search engines that automatically identify and retrieve digitized pathology data of statistically similar tissues from within distributed databases. In the future, the system will support the integration of high-resolution video streaming across Internet2's advanced network.^{25/}

^{23/} For more information on Internet2 members involved in high-performance networking applications in the health sciences, *see* <http://health.internet2.edu/projects/applications.html>.

^{24/} *See* <http://apps.internet2.edu/dvts.html>.

^{25/} *See* <http://www.internet2.edu/pubs/200608-IS-HS.pdf>.

- A number of institutions use Internet2's high-speed network to enable health sciences researchers across the country to share costly, state-of-the-art equipment without traveling to the equipment itself. For example, the Bruker Biflex III MALDI-TOF mass spectrometer at the University of Delaware and a scanning electron microscope at the University of Michigan are available for remote operation over Internet2's network.^{26/}

Internet2 also maintains active working groups in the areas of health sciences education,^{27/} clinical activities and practice,^{28/} orthopaedic surgery (including telemedicine and telerobotics),^{29/} radiology (including efforts to facilitate the transmission of extremely large image files),^{30/} and cardiology (including the use of remote computing facilities to model surgical procedures and heart catheterizations).^{31/} Internet2's annual member meetings always include significant programming dedicated to advances in telemedicine and long-distance medical education.^{32/}

2. Health Information Management.

The Commission's pilot program is also intended to explore the role of a national, dedicated broadband network in promoting the President's Health Information Technology Plan, including its goal of implementing a national database of electronic medical records. Again, Internet2 is uniquely suited among backbone providers to further this goal. Internet2 has long

^{26/} See *id.*

^{27/} See <http://health.internet2.edu/WorkingGroups/education.html>.

^{28/} See <http://health.internet2.edu/WorkingGroups/clinicalactivities.html>.

^{29/} See <http://health.internet2.edu/WorkingGroups/OrthopaedicSurgery.html>.

^{30/} See <http://health.internet2.edu/WorkingGroups/Radiology.html>.

^{31/} See <http://health.internet2.edu/WorkingGroups/Cardio.html>.

^{32/} See, e.g., <http://health.internet2.edu/library/SMMHealth.pdf>.

had a working group in health sciences security that addresses security- and privacy-related barriers to the adoption of emerging Internet technologies in the health sciences.^{33/} In partnership with the Association of American Medical Colleges, this group created guidelines to assist Academic Medical Centers in the adoption of privacy and security policies and best practices that satisfy the Health Insurance Portability and Accountability Act (HIPAA).^{34/} The group's work dovetails with Internet2's network security initiatives, which are focused on developing the advanced user authentication and identity management systems that are essential to the implementation of electronic medical record databases.^{35/}

Furthermore, Internet2 recently announced a partnership with the Healthcare Information and Management Systems Society ("HIMSS") to explore the development of a secure, reliable, and advanced networking solution for the transmission of medical information, messages, and images throughout the healthcare industry.^{36/} Working groups have already been established to support this partnership, including telehealth (focusing on the implications of reliable advanced networks for clinical practice), biomedical education (focusing on meeting the unique needs and resource requirements for biomedical education), identity management (focusing on identification and authentication of individuals regardless of physical location), and privacy and security (focusing on tools and techniques to assure the privacy and security of information that travels on the network).

^{33/} See <http://health.internet2.edu/WorkingGroups/Security.html>.

^{34/} See <http://www.aamc.org/members/gir/gasp/>.

^{35/} See <http://security.internet2.edu/>.

^{36/} Lauren Rotman, *Focused on Creating an Advanced and Interoperable Medical Network, HIMSS and Internet2 Announce Collaboration* (Aug. 1, 2006), available at <https://mail.internet2.edu/www/arc/i2-news/2006-08/msg00000.html>.

C. Internet2 Has Experience Integrating Regional Broadband Networks into an Interconnected National Network.

The challenges involved in building a ubiquitous, nationwide broadband network are considerable, but they are not new to Internet2. As part of its National K20 Initiative, Internet2 tackled similar challenges in the educational field. The Initiative involved promoting the connection of numerous state educational networks — comprising tens of thousands of widely distributed primary schools, secondary schools, libraries, museums and other educational institutions — to the Internet2 backbone.^{37/} Internet2's success with the K20 Initiative demonstrates its ability to integrate multiple dedicated institutional-access networks across the country into a useful, interconnected whole.

Over the past five years, Internet2 has connected 38 state educational networks to its national backbone. These networks in turn connect more than 46,000 primary and secondary schools, libraries, and museums.^{38/} Schools have used these connections to create virtual classrooms and laboratories that are revolutionizing the way students learn, regardless of their physical locations. Students now have access to master music classes taught by world-renowned musicians using DVD-quality videoconferencing, can remotely operate equipment like advanced electron microscopes to perform science experiments, and can observe profound environmental events in real time. For example, San Francisco's Exploratorium science museum, an early adopter of Internet2 technology, partnered with NASA to provide K-12 schools and local

^{37/} For an overview of the National Internet2 K20 Initiative, *see* <http://k20.internet2.edu/index.php>.

^{38/} Lauren Rotman, *Internet2 Marks Five Year Anniversary of its Sponsored Education Group Participant Program* (Aug. 11, 2006), *available at* <https://mail.internet2.edu/wws/arc/i2-news/2006-08/msg00002.html>.

museums around the country with real-time, high-definition streaming video of a total solar eclipse in Turkey over Internet2's network.

To support this initiative, Internet2 has hired dedicated staff and coordinated a large group of its members, who share best practices, create interstate partnerships among schools, highlight useful applications, and otherwise help the education community capitalize on its connection to Internet2's network. Internet2 can leverage this experience to foster an equally robust nationwide health care network under the Commission's pilot program.

D. Internet2's Backbone Network Is Extremely Reliable and Secure, and It Is Backed By an Experienced and Stable Organization.

Internet2 has a long and proven record of providing a backbone network with carrier-class reliability, cutting-edge security, and highly scalable bandwidth.^{39/} These characteristics are essential to a nationwide broadband health care network. Moreover, Internet2 is on the cusp of deploying a new hybrid optical and packet network called the Internet2 Network, which will offer the same carrier-class reliability^{40/} and even greater technical capabilities than the current Abilene network.^{41/}

Internet 2's backbone is reliable. A national broadband health care network cannot go down in the middle of a remotely managed surgical procedure or lose connectivity during a

^{39/} See <http://abilene.internet2.edu/>.

^{40/} At the same time, Internet2 will maintain full control over provisioning and operation of the Internet2 Network and the services that are offered on it.

^{41/} See <http://www.internet2.edu/network/> for detailed information on Internet2 Network characteristics, architecture, value-added capabilities, reliability, and community control. The first Internet2 connectors will begin transitioning to a portion of the new Internet2 Network before the end of this year, and Internet2 expects no difficulties in transitioning from the current Abilene network to the Internet2 Network. Internet2 expects to complete its fourth and final phase of network buildout for the Internet2 Network in June 2006

national health crisis. Internet2's backbone has been in continuous operation since 1998 and has an unmatched track record of reliability. Thanks largely to its professional, carrier-class, 24-hour monitoring, maintenance, and support,^{42/} Internet2 has an overall network reliability of 99.998%. In practice, this means less than a five and a half minutes of network downtime annually.^{43/} In addition, Internet2 provides open access to the network performance data collected and analyzed on an hourly basis by its extensive monitoring system, making it an ideal test bed for the Commission's pilot program.

In recognition of this reliability, numerous federal entities and international organizations have become Internet2 members and connect to the Internet2 backbone.^{44/} These organizations rely on Internet2's backbone to support sensitive applications. For example, the Department of Energy uses Internet2 to support its Energy Sciences Network ("ESnet"), a high-speed network that connects more than 30 DOE laboratories, provides networking to over 100,000 DOE laboratory scientists, and is also used by more than 18,000 researchers from universities, other government agencies, and private industry. Due in large part to Internet2's high level of

^{42/} Contrary to NLR's implication, however, Internet2's use of its network is not constrained in any material way by third party rules. Petition ¶¶ 2, 13 n.9.

^{43/} Internet2's extraordinary reliability will continue with its new network because it, too, will enjoy professional, carrier-class, 24-hour monitoring, maintenance, and support.

^{44/} Federal entities that are Internet2 members and connect to Internet2's backbone include NASA Jet Propulsion Lab, the Library of Congress, Los Alamos National Laboratory (Department of Energy), NASA Goddard Space Flight Center, NASA Marshall Space Flight Center, National Archives and Records Administration, National Institutes of Health, National Oceanic & Atmospheric Administration, National Science Foundation, Oak Ridge National Laboratory (Department of Energy), Pacific Northwest National Laboratory (Department of Energy), the U.S. Census Bureau, the U.S. Antarctic Program, the U.S. Department of Commerce Boulder Labs, and the U.S. Holocaust Memorial Museum. Likewise, three major international institutions are Internet2 members and connect to the Internet2 backbone: the Inter-American Development Bank, the United Nations System of Organizations, and the World Bank.

reliability, ESnet chose Internet2 as its partner for deploying ESnet4, a highly reliable, high-capacity national network that will greatly enhance the capabilities of researchers across the country who participate in DOE's scientific research efforts. Internet2 will provide the new ESnet4 infrastructure, and the new network will initially operate on two dedicated 10 gigabit per second wavelengths, delivering production IP capabilities and new optical services that will serve as an advanced and dependable platform for scientists and researchers.

Internet2 is at the forefront of network security research and practice. Internet2's network security monitoring and analysis are provided by the Research and Education Networking Information Sharing and Analysis Center ("REN-ISAC"). REN-ISAC's mission is "to improve network security through information collection, analysis, dissemination, early warning, and response." Its services and products are specifically designed to support the needs of organizations connected to serve higher education and research networks.^{45/} In addition, Internet2's middleware initiative makes available both tools and expertise to assist members with identity management, security, privacy, and role-based privileges — essential components of any system transmitting sensitive medical and health information.^{46/}

Internet2's backbone has ample capacity and will soon have more. The current Internet2 Abilene Network carries 10 gigabits per second ("Gbps") and has been provisioned with excess capacity to support both the emergence of new applications and the expansion of the community served to include groups such as the broader education community and health care networks. And Internet2's backbone capabilities will continue to grow with the imminent deployment of the Internet2 Network, its new advanced nationwide hybrid network infrastructure with enhanced

^{45/} See <http://www.ren-isac.net/>.

^{46/} See <http://middleware.internet2.edu/>.

IP services as well as new dynamic optical capabilities. Internet2's new next generation network will deploy a Dedicated Waves System (DWS) over the advanced state-of-the-art Infinera optronics system supporting 10-Gbps wavelengths nationally at the outset, and will be extensible to 40 wavelengths with the capability to offer 40- and 100-Gbps interface support.^{47/} In the event more than 40 wavelengths were required, Internet2's agreement with Level 3 will enable Internet2 to deploy additional Dedicated Waves Systems without incurring large capital outlays.

Beyond the DWS facility, the new Internet2 nationwide ubiquitous broadband network will also offer many other services and unique capabilities, including wave services, off-net circuits, and dark fiber services. Moreover, Internet2's new network will have significant advantages when compared to other networks, including the ability (i) to extend exponential capacity upgrades and much greater bandwidth flexibility, (ii) to allow short-term and long-term dedicated circuits to meet individual and institutional capacity needs, (iii) to allow for dynamic circuit provisioning within seconds and to provide advance reservations of circuits to support an even broader range of applications and research, (iv) to allow static wave provisioning to multiple wavelengths to allow connectors the ability to more efficiently allocate bandwidth, and (v) to support upcoming 40-Gbps and 100-Gbps interfaces as these standards emerge. This next generation network will open new frontiers to advance discovery, research and collaboration, and will offer a scalable and adaptable platform for accelerating the pace of scientific discovery, research and development.

^{47/} The new Internet2 network builds upon successful tests of dynamically provisioned optical waves for ESnet conducted earlier this year by the Hybrid Optical and Packet Infrastructure project ("HOPI") of the Internet2 member community. *See* <http://networks.internet2.edu/hopi/>.

Internet2 is organizationally stable and financially sound. Internet2 has a paid staff of over 100 people dedicated to maintaining its network, collaborating with member and constituent institutions, and planning for the future. (By contrast, it is Internet2's understanding that NLR has only a handful of full-time employees.) In addition to its admirable 10-year organizational track record, Internet2 has a viable business plan to carry it through the two-year pilot program and beyond. Internet2 is debt free and began 2006 with nearly \$30 million in reserves for future investments and network upgrades. It consistently receives unqualified audits from its outside audit firm.

CONCLUSION

The Commission's pilot program is an essential test of how best to promote the development of a unified national health care network. That test will yield the practical information the Commission needs only if the state and regional health care networks funded by the pilot program are able to communicate with one another across a single national backbone. The Commission correctly chose Internet2 to serve this function.

NLR's Petition should be denied because it would fragment the Commission's pilot program and substantially diminish its utility.

Respectfully submitted,

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November 21, 2006

CERTIFICATE OF SERVICE

I, Carole Walsh, do hereby certify that I have on this 21st day of November, 2006, caused to be served true and correct copies of the foregoing Comments of Internet2 Regarding National LambdaRail, Inc.'s Petition for Reconsideration or Clarification upon the following persons via first-class United States mail, postage prepaid:

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